# REMARKS

The rejections under Section 112 have been obviated. The replacement sheet for figure 5 has been included and no new matter has been added. Applicant believes that his application is now in allowable form and requests an early favorable action.

Respectfully submitted,

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## V. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, where the present invention is generally referred to with numeral **10**, it can be observed that it basically includes temperature sensor-coupling unit **20**, panel support bracket **40**, and display panel assembly **60**.

As shown in figure 1, panel support bracket **40** slides onto and is snugly secured onto sensor-coupling unit **20**, which is removably attached to display panel assembly **60**.

As seen in figures 2 and 2a, sensor-coupling unit **20** comprises male thread **32** outwardly extruding from face **30** and terminating at edge **34**, and female thread **29** intrudes within sensor-coupling unit **20** a predetermined distance from edge **28**. Approximately perpendicularly extending from face **30** is cylindrically shaped face **22** that extends to ridge **24**. Cone **26** tapers slightly from ridge **24** and terminates at edge **28**. Extending from face **22** is connecting cable **36**, which terminates at connector **38**. Connector **38** plugs into a port, not seen, opposite display panel **62** of display panel assembly **60**.

As seen in figure 3, panel support bracket **40** comprises base **52**. Approximately perpendicularly extending from base **52** is frame **50**, which secures to tapered ring **42**. Tapered ring **42** has interior wall **44** and edges **46** and **48**. Tapered ring **42** has cooperative characteristics to snugly fit onto cone **26**.

As seen in figure 4, display panel assembly **60** comprises frame **64**. Frame **64** has through-hole **66** to provide for means to removably secure to base **52**. Such means may be a screw that trespasses through-hole **66** and attaches to base **52** for example. Display panel assembly **60** also has display panel **62** and buttons **68**.

Referring to figure 5, embedded within the sensor-coupling unit **20** is a thermocouple sensor **21** in the preferred embodiment. Thermocouple sensor **21** responds to temperature changes within the sensor-coupling unit **20**. The thermocouple sensor **21** generates a thermoelectric voltage in the temperature gradient that exists between a hot (junction exposed to the temperature being measured) and cold junctions. A cold-junction compensator **23** is used connected to input **23'** to develop a compensation signal on output **23"**, which automatically varies with the cold junction temperature in such a way to maintain the output signal constant for a constant temperature measurement.

Analog-to-digital device **25** receives the linear voltage of output 23" over the range of interest and processes the signal to the computer or microprocessor **27** to translate to output **27'** and display as the actual temperature reading on the display panel **62**, which in the preferred embodiment is a liquid crystal display (LCD). Another embodiment for display panel **62** includes microprocessor-based circuitry to connect directly to device **25**.

Also embedded within the sensor-coupling unit **20** is a conductivity sensor **31** for detecting the presence of water within the sensor-coupling

unit **20**. The conductivity sensor **31** consists of metal measuring electrode(s), not seen, that monitor the presence of water by one of two basic methods. One measures conductivity by a fixed voltage between electrodes so that the resulting current flow is directly proportional to the conductivity. On the other hand, the electrodes can be supplied with a current flow so that the potential between the electrodes are directly proportional to the resistance of the water, which is the reciprocal of its conductivity.

A main operation of microprocessor **27** is to monitor signals from the thermocouple sensor **21** and conductivity sensor **31** simultaneously, in order to detect actual water temperature as it discharges. When water flow ceases to discharge out the showerhead **86**, seen in figure 6, it also ceases to be present at sensor-coupling unit **20**. Therefore, by monitoring the conductivity inside the sensor-coupling unit **20**, instant invention **10** can detect when water is no longer present at the showerhead **86**. Microprocessor **27** commands will then halt the displaying of temperature and redirect its instructions to display a text message indicating that water is no longer present. Microprocessor **27** defining part of the microprocessor-based circuitry seen in figure 5, has a programmable memory storage system, not seen, used for retrieving multi-user temperature settings.

An additional essential feature of instant invention **10** allows users to save desired shower temperature settings into memory and recall them later in time with push buttons **68**. The instant invention **10** can save user temperatures along with unique user identification with the programmable

memory storage system, within microprocessor **27**, for future association purposes. When a user turns on hot and cold water, an indeterminate amount of time elapses until the desired water temperature arrives at the showerhead **86**. This waiting period can be exacerbated if extreme cold or hot ambient temperatures exist in relation to the desired temperature. The present invention **10** alerts users when the shower temperature has reached their desired setting by producing an audible tone with buzzer **39** that can be silenced by the user entering the shower. As a safety feature, a warning tone alerts a user to potential scorching if the temperature has passed a preprogrammed temperature setting. This allows a user to correct the temperature safely before entering the shower. It is noted that the instant invention is powered by a battery power source such as an electric battery, ~~which is not~~ as seen in figure 5 ~~for simplicity~~. The electric battery may be an electric dry cell battery.

Referring to figure 6 for installation, shower assembly **80** comprises wall **82**. Protruding from wall **82** is shower arm **84**, and removably secured onto shower arm **84** is showerhead **86**. Sensor-coupling unit **20** is detachable from panel support bracket **40** to allow installation simplicity. Sensor-coupling unit **20** attaches directly onto existing standard shower arm **84** by first removing the existing showerhead **86**. After existing showerhead **86** is removed and placed aside, ring **42** from panel support bracket **40** is slipped along shower arm **84**. While the panel support bracket **40** hangs on the shower arm **84**, the female end, at edge **28**, of the sensor coupling unit **20** is attached to the shower arm **84** by rotating clockwise until it tightens. The panel support bracket **40** is then slid down the shower arm **84** until it snugly mounts upon the sensor-coupling unit **20**. Finally,

display panel assembly **60** is ready for attaching to the panel support bracket **40**.

Sensor-coupling unit **20**, panel support bracket **40**, and display panel assembly **60** can be maintained joined and installed in a single step; although, separating the units proves to be more comfortable for installation purposes. Once all the units are assembled, the terminating connector **38**, better seen in figure 2, from the connecting cable **36** can be plugged into the port, not seen, of display panel assembly **60**. At this time the instant invention **10** can be switched on. Users have the ability to tilt and swivel the display panel **62** at any time to the desired viewing angle. The present invention's uniqueness is its straightforwardness installation process.

The foregoing description conveys the best understanding of the objectives and advantages of the present invention. Different embodiments may be made of the inventive concept of this invention. It is to be understood that all matter disclosed herein is to be interpreted merely as illustrative, and not in a limiting sense.